

WL-TR-94-3163

**RESEARCH CAPABILITY DATA
ON SELECTED HISTORICALLY BLACK
COLLEGES AND UNIVERSITIES,
REVISION 1**



James R. Johnson

**CSA Engineering, Inc.
2850 W. Bayshore Road
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FEBRUARY 1994

FINAL REPORT FOR PERIOD SEPTEMBER 1993 - JANUARY 1994

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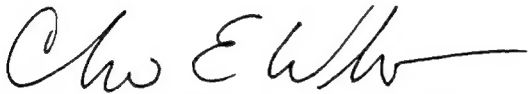
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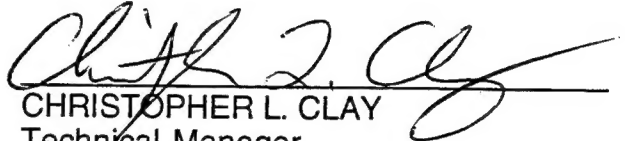
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13. ABSTRACT (Maximum 200 words) A Structural Research Capability Database of HBCUs was developed which can be used to recall data about HBCU faculty capabilities and research interests, and university research facilities. The records are focused toward Flight Dynamics Directorate research and technology needs and should facilitate and increase faculty and student participation in the Flight Dynamics Directorate research programs by familiarizing Flight Dynamics Directorate in-house researchers with those at the cited HBCUs. Additional records may be appended to the database. More data were obtained than was contemplated, some universities provided brochures and other additional, published data. This report serves as a user's guide for the database program.					
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FOREWORD

This report was prepared by the Aerospace Structures Information Analysis Center (ASIAC), which is operated by CSA Engineering, Inc. under contract number F33615-90-C-3211 for the Flight Dynamics Directorate, Wright-Patterson Air Force Base, Ohio. The report presents work performed under ASIAC Task No. 42. This effort was sponsored by the Structural Integrity Branch, Structures Division, Flight Dynamics Directorate, WPAFB, Ohio, with Mr. Christopher Clay as the technical monitor. The study was performed by Mr. James R. Johnson.

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1.0 Introduction

The National Association for Equal Opportunity in Higher Education has published a survey titled "An Inventory of the Capabilities of the Historically Black Colleges and Universities and Other Minority Institutions (HBCUs/MIs): A NAFEO/DoD Survey", Second Edition, 1989. This document lists over a hundred institutions and is a useful resource for strategic planning. But, currency, applicability, and accessibility of HBCU data for use by individual researchers is also important to the Flight Dynamics Directorate HBCU initiative. From a university perspective, the Wright Laboratory "Points of Contact" booklet, is a useful and handy tool for determining which researchers to telephone about a particular research area. A database that is suitable for Flight Dynamics Directorate researchers should be a similar tool. With a database it is a simple matter for government researchers to link their topics to the recorded interests of individual HBCU researchers.

Such a Research Capability Database of HBCUs was developed which can be used to look up HBCU faculty capabilities and research interests, and university research facilities. The data is focused toward Flight Dynamics Directorate research and technology needs and should facilitate and increase faculty and student participation in the Flight Dynamics Directorate research programs by familiarizing government researchers with those at the cited HBCUs. Flight Dynamics Directorate and university research interests are linked. The data can be updated, and new data appended.

Meetings were held on fifty-six occasions at forty-one universities to acquire data. An overview of each university is given. Unique facilities are described. Some universities provided brochures and other publications. These data are listed in appendix A.

2.0 Overall Program

2.1 Program Plan and Accomplishment.

Efforts were concentrated in four distinct areas: (1) program planning and execution, (2) coordination with the government, (3) meetings held at universities to acquire data, and (4) database development.

Twenty four trips were selected which would maximize the number of HBCUs for inquiry. Minimum data requirements were defined for input to a database. Database specifications were modified as necessary. Coordination with the Flight Dynamics Directorate focal point was maintained throughout the program.

Much more was accomplished than planned. Table 1. lists the number of planned and actual events, and an accomplishment ratio derived from these numbers. The final actual/plan accomplishment ratio is 1.85, when complementary successes are included. This is almost double the plan at planned costs. The complementary successes, such as Palace Knight applications, occurred as uninitiated responses during solicitations for database data.

Table 1. Accomplishments

	PLAN	ACTUAL
-----	-----	-----
GOVERNMENT MEETINGS	24	32
NR OF TRIPS	24	32
HBCUS VISITED	24	41
HBCUS REVISITED	12	15
DATA SHEETS OBTAINED	144	279
DATABASE DESIGN & DEVELOPMENT	1	1
COMPLEMENTARY ACCOMPLISHMENTS		
concept papers	0	14
proposals	0	3
Palace Knight applications	0	8
faculty visits arranged	0	1
	-----	-----
	229	423

ACTUAL/PLAN ratio 1.85

2.2 Coordination with the Flight Dynamics Directorate Project Engineer

2.2.1 Meetings

Periodic meetings were held with the Flight Dynamics Directorate project engineer to review the HBCU data acquired, database software design, and to coordinate intermediate travel plans for campus visits. At the initial meeting the list of selected HBCUs, the proposed travel plan, a data input form, and the database specification were confirmed without revision. During subsequent meetings, progress and status reports were made and often the schedule of campus visits was revised. In October, 1991, the prototype database computer program was demonstrated. In June 1992 the program was delivered to the Flight Dynamics Directorate.

2.2.2 Selection of HBCUs

In 1989 "The National Association For Equal Opportunity In Higher Education" produced a second edition of the NAFEO/DoD survey of the capabilities of HBCUs. This document contains the largest listing of Department of Defense recognized HBCUs published. It, along with previous university data from Flight Dynamics Directorate files, provided a list of HBCUs with science, engineering, mathematics, computer science, or engineering technology curriculums from which to make selections. From an initial listing of twenty-four HBCUs, twelve were chosen for on-site inquiries during the first phase of the effort. In the next phase nineteen more were chosen.

2.2.3 Travel

Some universities are near others. This permitted, at times, visitations to more than one university in a span of two or three days. For example, Morehouse College and Clark Atlanta University are in the same city, Atlanta, Georgia. Meetings at these occurred in one day. Considered separately, a university such as Wilberforce may not have been visited at all in favor of a more technically oriented university. In some cases two technically strong universities were covered in one, two-day trip. Jackson State and Grambling State are such examples, even though these are located in two different states, Mississippi and Louisiana.

2.2.4 Input Data Requirements per Individual Researcher

1. SCHOOL:
2. DEPARTMENT:
3. DEPARTMENT TELEPHONE:
4. FIRST NAME:
5. MIDDLE NAME:
6. LAST NAME:
7. TITLE (MR,MRS,DR,PROF,ETC):
8. FACULTY (Y/N):
9. STUDENT (Y/N):
 - A. DEGREE OR CLASSIFICATION
10. ADMINISTRATOR (Y/N):
11. HAS GOV'T CONTRACT (Y/N):
12. WORK PHONE 1:
13. WORK PHONE 2:
14. FAX NUMBER:
15. MAIL CODE:
16. CITY:
17. STATE:
18. ZIP:
19. RESEARCH INTERESTS:
 - A.
 - B.
 - .
 - .
 - J.
20. NOTES/COMMENTS (IF DESIRED):

2.2.5 Database

The files are accessed and manipulated by way of a nested menu driven system. The research facilities described are one-of-a-kind, unique, novel, or special. Basic facilities required for academics, such as computer laboratories, and engineering laboratories are not included. Submenu items provide for addition of data, editing/changing existing data and searching/retrieving data items by way of linked databases, school identification numbers, browsing, discipline in terms of COSATI codes, etc. The technical design maximizes the use of linked databases and lookup tables to minimize the input data requirements and the input data validation items.

3.0 Meetings at the Universities

3.1 Universities Visited

Over the course of thirty-two trips, fifty-eight meetings were held at forty-two HBCUs. Table 2 lists the HBCUs in the order of the first visit date.

Table 2. Historically Black Colleges and Universities Visited

UNIVERSITIES		CITY & STATE		DATES
1	Bennett College	Greensboro	NC	Jun 91
2	North Carolina A&T	Greensboro	NC	Jun 91
	North Carolina A&T			Dec 92
3	Central State University	Wilberforce	OH	Jun 91
	Central State University			Oct 92
	Central State University			Mar 93
4	Wilberforce University	Wilberforce	OH	Jun 91
5	Howard University	Washington	DC	Jul 91
	Howard University			Apr 93
6	Clark Atlanta University	Atlanta	GA	Jul 91
7	Morgan State University	Baltimore	MD	Sep 91
	Morgan State University			Apr 93
8	University of DC	Washington	DC	Sep 91
	University of DC			Apr 93
9	Alabama A&M University	Normal	AL	Oct 91
	Alabama A&M University			Nov 92
10	Tennessee State University	Nashville	TN	Oct 91
11	South Carolina State College	Orangeburg	SC	Oct 91
	South Carolina State College			Sep 93
12	Tuskegee University	Tuskegee	AL	Nov 91
	Tuskegee University			Oct 92
13	Florida A&M University	Tallahassee	FL	Nov 91
	Florida A&M University			Jan 93
14	Prairie View A&M University	Prairie View	TX	Feb 92
	Prairie View A&M University			Mar 93
15	Texas Southern University	Houston	TX	Feb 92
	Texas Southern University			Mar 93
16	Dillard University	New Orleans	LA	Mar 92
	Dillard University			Nov 93
17	Southern University, BR	Baton Rouge	LA	Mar 92
	Southern University, BR			Nov 93
18	Southern University, NO	New Orleans	LA	Mar 92
19	Grambling State University	Grambling	LA	Mar 92

20	Jackson State University	Jackson	MS	Mar 92
21	Morehouse College	Atlanta	GA	Apr 92
22	Morris Brown College	Atlanta	GA	Apr 92
	Morris Brown College			Nov 92
23	Spelman College	Atlanta	GA	Apr 92
24	Norfolk State University	Norfolk	VA	Nov 92
25	Hampton University	Hampton	VA	Nov 92
26	Miles College	Fairfield	AL	Nov 92
27	Talladega College	Talladega	AL	Nov 92
28	Shaw University	Raleigh	NC	Dec 92
29	North Carolina Central University	Durham	NC	Dec 92
30	Edward Waters College	Jacksonville	FL	Jan 93
31	Bethune Cookman College	Daytona Beach	FL	Jan 93
32	Huston-Tillotson College	Austin	TX	Mar 93
33	Paul Quinn College	Dallas	TX	Mar 93
34	Sojourner-Douglas College	Baltimore	MD	Apr 93
35	Coppin State College	Baltimore	MD	Apr 93
36	Atlanta University Center	Atlanta	GA	Apr 92
	Atlanta University Center			Apr 93
37	Benedict College	Columbia	SC	Sep 93
38	Claflin College	Orangeburg	SC	Sep 93
39	Lincoln University	Lincoln University	PA	Oct 93
40	Cheyney University	Cheyney	PA	Oct 93
41	University of Arkansas at PB	Pine Bluff	AR	Nov 93
42	Xavier University	New Orleans	LA	Nov 93

3.2 Typical Visit Agenda at the Universities

Telephone calls and letters of introduction preceded most meetings for scheduling purposes. Generally, a meeting with university research administrators and department chairmen was held at the outset of a visit. During the meeting a briefing on the FDD HBCU initiative was given and survey data input forms for the database files was solicited. A briefing by a university spokesperson about the university research and capability and a tour of facilities and laboratories usually followed. Published data on research capability was often received. Follow up letters and calls were sometimes necessary to obtain additional data.

Frequent reports on data received and the database design and development were made to the contract monitor.

4.0 University Data

4.1 Format of the Data Listed

The data is presented in alphabetical order of the university names with information about each, generally, in this order.

1. University street, mailing address and telephone number.
2. Name, position, address and telephone number of the person who hosted the meeting, or is the university focal point for government contracting.
3. Information related to the fields of science, engineering, computer science, mathematics, and engineering technology such as the academic degrees awarded, professional accreditation by the Accreditation Board for Engineering and Technology (ABET), research programs, and facilities.

Information about individual researchers is recorded in the software database. Brochures and other descriptive pamphlets received are listed in APPENDIX A.

4.2 Alabama Agricultural and Mechanical University

1. Normal, AL 35762-0000, (205) 851-5000
2. Dr. Jeanette Jones, P.O. Box 411, (205) 851-5675, Director of the office of "Grants, Contracts, and Federal Relations".
3. The university has the ABET accreditation. It grants a Bachelor's, Masters's, Educational Specialist, and Doctorate of Philosophy degree in its Schools of Agriculture, Arts and Sciences, Business, Education, and Engineering and Technology. The School of Engineering & Technology degrees are the B.S. degree in Civil Engineering, Electronics, Electrical Engineering, Mechanical Engineering, Computer Science, Design Technologies, Physics, and Mathematics. It awards the M.S. and Ph.D. degrees in Optics/ Lasers and Material Science. It has contract experience with the Department of Defense, including on-site contractors. Unique in the state is the Alabama A&M Center for Irradiation of Materials. Collaborators are at University of Alabama at Huntington, University of Alabama at Birmingham, Massachusetts Institute of Technology, University of Massachusetts at Lowell, Cornell University, City University of New York, Syracuse University, University of Sao

Paulo, Brazil, Oak Ridge National Laboratory, NASA/Marshall Space Flight Center, Nichols Research Corporation, United Technology Research Center, United Applied Technology, and Wyle Laboratories.

4.3 Atlanta University Center Complex

1. 111 James P. Brawley Drive, Atlanta, GA 30314-0000
2. Three Atlanta University Center Colleges were represented over the course of two meetings.
 - a. Mr. Oliver Delk, Development Department, Morehouse College (404) 215-2668.
 - b. Mr. Ivan L. Page, Director of Development and Government Relations, Spelman College (404) 215-2615.
 - c. Ms. Sheila Harris, Special Assistant to the Director, Morris Brown Research Institute, (404) 220-01271.
3. The Atlanta University Center Complex also includes Clark Atlanta University. The academic program at each of these four schools includes a five year dual degree engineering program. Participating institutions are Georgia Institute of Technology, Boston University, Rochester Institute of Technology, and Auburn University, Rensselaer, and University of Alabama-Huntsville.

4.4 Benedict College

1. Harden & Blanding Sts, Columbia, SC 29204-0000
2. Dr. Lanita S. Scott, Chairperson, Biology and Physical Science, Rm215, Alumni Hall, (803) 253-5006

4.5 Bennett College

1. 900 E. Washington Street, Greensboro, North Carolina, 27410-3298, (919) 273-4431, FAX (919) 378-0511
2. Dr. Gloria Scott, President
3. A private college for women with 600 full time undergraduate students. The most popular degrees are Business and Management, Life Sciences, Letters, and Education. Of the

students entering graduate studies within one year of graduation, most enter medical schools and MBA programs. Faculty interest is not directed toward aerospace research.

4.6 Bethune Cookman College

1. 640 Second Ave, Daytona Beach, FL 32114-3099

4.7 Central State University

1. 1400 Brush Row Road, Wilberforce, OH 45384-9999, (513) 376-6478, FAX (513) 376-6530

2. The host for the meeting was Dr. Melvin Johnson, Vice President for Academic Affairs, (513) 376-6011. Col James H. Sangster, US Army, retired, serves as the focal point for US government contracts from his position as Executive Director for the Institute for International Affairs, (513) 376 6660/6312.

3. The university has the ABET accreditation. An Associate in Applied Science, and the Bachelor of Science degree is awarded in the various fields of natural science, in Mathematics, Computer Science, and Manufacturing Engineering. Other engineering degrees can be awarded through a dual degree program with Wright State University, Fairborn, Ohio. There are no current enrollments in this dual degree program. The Manufacturing Engineering Department benefits from on going interactions and contracts with the Manufacturing Technology and Materials Directorates at Wright Patterson Air Force Base. The department has plans to include subsonic wind tunnel testing and testing of USAF models in support of its fluid mechanics curriculum. A wind tunnel suitable for fluid mechanics demonstrations was obtained in early 1992.

4.8 Cheyney University

1. Cheyney, PA 19319-0000
2. Dr. W. Clinton Pettus, Vice President for Academic Affairs, Cheyney University, Cheyney PA 19313, (215) 399-2271

4.9 Claflin College

1. 400 College St. N.E., Orangeburg, SC 29115-4472
2. Dr. S.S. Sandhu, Dir of Res & Fed Grants Coordinator, Rm 125, JST Science Bldg, (803) 535-5244

4.10 Clark Atlanta University

1. 111 James P. Brawley Drive, S.W., Atlanta, Georgia, 30314-4389, (404) 880-8000
2. Dr.s Kofi Bota and Puri
3. In July, 1989, Clark College, an undergraduate education institution, and Atlanta University, a graduate and professional education institution, became a single, comprehensive university offering Baccalaureate to Doctor of Philosophy degree programs. The university has a goal of developing an Aerospace Sciences Research Development Center funded by Wright Patterson Air Force Base, the Air Force Office of Scientific Research, the aerospace industry, and the National Aeronautics and Space Administration.

4.11 Coppin State College

1. 2500 W. North Ave, Baltimore MD 21216-3698
2. Dr. James Gilroy, Professor of Mathematics and Computer Science
3. The college offers the Bachelor's and Master's degrees. Math, science and engineering are not among the popular major fields of study. However, the college does have a dual degree engineering program. Students start at Coppin and finish at the University of Maryland School of Engineering. After three years the students transfer to the engineering school. After four years a degree is received in Mathematics, Chemistry, or General Science. After five years the student receives the Bachelor's degree in engineering in a particular field from the University of Maryland. College professors have had contracts with DoD, but not the USAF. The capability to perform such research is based on the capability of typical instructional laboratories.

4.12 Dillard University

1. 2601 Gentilly Boulevard, New Orleans, Louisiana 70122-3097, (504) 283-8822

2. Dr. James J. Prestage, Chairman, Division of Natural Sciences, (502) 286-4722.

3. Dillard University is a private liberal arts institution. It awards the Baccalaureate degree in Biology and Public Health, Physics, Mathematics, Computer Science, and Chemistry. Some research is accomplished, but the first priority is teaching. There are 400 students in the Division of Natural Sciences, with most studying computer science.

4.13 Edward Waters College

1. 1658 Kings Rd, Jacksonville, FL 32209-6199

2. The university is non-accredited, but efforts are underway to regain accreditation.

The students entering the university usually have low high school achievement records. The university's goal is to make these student achievers and competitive upon graduation. There appears to be above average success in this regard.

4.14 Florida Agricultural and Mechanical University

1. Martin Luther King Boulevard, Tallahassee, FL 32307-2964, (904) 599-3115, FAX (904) 599-3347

2. Mr. Tim L. Beard, M.S., Director, Career Placement, (904) 487-6171; Dr. J. Willard Toliver, Associate Dean and Professor, (904) 487-6423, both of the "Florida Agricultural and Mechanical University/Florida State University College of Engineering (FAMU/FSU CE)", Innovation Park, Tallahassee, Florida.

3. The university has the ABET accreditation. FAMU awards an associates degree, and has Baccalaureate to Doctor of Philosophy degree programs. FAMU/FSU CE is located about three miles from the main campuses of both universities. Both universities have their own computer centers and the college has a computer network facility with both centers. Student are required to use the computers in their engineering studies. A Cray Y-MP and a Connection Machine 2 supercomputers are available for engineering instruction and faculty and graduate student research. The Joint Institute for Graduate Engineering Education and Research has been established between the Naval Coastal Systems Center and the college in

order to conduct collaborative research programs and to enable the scientists and researchers to obtain graduate degrees. Research is conducted in such diverse areas as structural analysis of bridges and roads, superconductors, laser beam propagation through water, unsteady aerodynamics, three dimensional flow diagnostics, advanced composites, computer integrated manufacturing and robotics, and others.

The college receives about \$4 million annually in externally sponsored research. Among the DoD sponsors are DARPA and AFOSR.

4.15 Grambling State University

1. P.O. Drawer 607, 100 Main Street, Grambling, LA 71245-0000, (318) 247-3811.
2. Dr. Gerald L. Ellis, Dean, College of Science and Technology, (318) 274-2414.
3. Grambling State University awards an Associates degree, and has Baccalaureate to Doctor of Philosophy degree programs. Dr. Jethro Terrell of the Physics Department expressed an interest in conducting USAF structural testing.

4.16 Hampton University

1. 491 W. Queen St, Hampton, VA 23669-3799
2. Mrs. Joyce Taylor, Federal Relations Officer, Office of the V.P. for Development 23668, (804) 727-5356

4.17 Howard University

1. 2400 Sixth Street, N.W., Washington, D.C. 20059-0001, (202) 636-6200, FAX (202) 636-5960.
2. Dr. Avis Y. Pointer, Assistant to the Vice President for Research, Howard University, 525 Bryant st., N.W., Washington, D.C. 20059, (202) 806-5567; Dr. Upper Gill, Director of the Computational Science and Engineering Research Center, (202) 806-5006, FAX (202) 806-4626.
3. The university has the ABET accreditation. The School of Engineering offers studies leading to the following degrees: BS Chemical Engineering, B.S. Civil Engineering, B.S. Computer Engineering, B.S. Mechanical Engineering, Master of Computer Science,

Master of Engineering (CE), Master of Urban Systems Engineering, Ph.D. EE, Ph.D. ME. The graduate school of Arts and Sciences offers among its other degrees, the M.A., M.S., and Ph.D. degrees in the traditional fields of natural science, Computer science and Mathematics. Howard University is an HBCU leader in research.

4.18 Huston-Tillotson College

1. 1820 E. 8th Street, Austin, TX 78702-2762
2. Dr. Lenora D Waters, VP Academic Affairs, 900 Chicon, (512) 505-3076
3. Huston-Tillotson College is a small liberal arts school with an enrollment of 650.

Interest expressed in A/C cost & weight estimation, statistical analysis and optimization.

4.19 Jackson State University

1. 1400 J.R. Lynch Street, Jackson, MS 39217-0001, (601) 968-2121, FAX (601) 968-2358.

2. Dr. Abdul K. Mohamed, Dean, School of Science and Technology (SST), (601) 968-2153, Dr. William L. White, Assistant Dean, and Ms. Rita Pressley, Office of Research Administration.

3. Jackson State University has Baccalaureate to Doctor of Philosophy degree programs. The School of Science and Technology (SST) graduates more African-Americans in computer science than any other university in the U.S. There are many equipped laboratories and research facilities. Jackson State University has an alliance with these other HBCUs: Jackson State University, Alabama A&M University, Prairie View A&M University, and Southern University and A&M College. The university holds an annual "Technical Assistance Conference for Historically Black Colleges and Universities" whereby HBCU administrators and faculty meet with federal agency representatives.

4.20 Lincoln University

1. Old Baltimore Pike, Lincoln University, PA 19352-0000
2. Mr. Jerry Isaac, Office of the Vice President for Academic Affairs, Lincoln University, Lincoln University PA 19352, (215) 932-8300 x435

3. Lincoln University offers pre-professional programs in engineering. These are a part of a 3yr-3yr program with Drexel University and a 3yr-2yr program with Pennsylvania State University, Lafayette College, and New Jersey Institute of Technology. These programs lead to a B.A. from Lincoln University and a B.S. degree from one of the engineering schools. An optional cooperative education program provides alternate periods of academic study and career related employment. The university has a strong research capability through grants and contracts with government and industrial agencies. Research conducted includes theoretical physics studies on the Superconducting Super Collider in conjunction with the Particle Detector Research Center at Prairie View University (another HBCU). Lattice gauge theoretical work in physics and other chemical research is underway.

4.21 Miles College

1. 5500 Myron Massey Blvd, Fairfield, AL 35064-2621
2. Mr. Winton Ford, Dir, Development, 5500 Myron Massey Blvd., (205) 923-2771
3. Miles is a small liberal arts school with an enrollment of 730. BS degrees in Biology, Chemistry, Math and Math Ed are offered. Current activities include renovating the labs, curriculum development and encouraging research (a requirement for seniors). Miles expressed an interest in AI system development.

4.22 Morehouse College

1. 830 Westview Drive, S.W., Atlanta, GA 30314-1427, (404) 681-2800.
2. Mr. Oliver Delk, Development Department, Morehouse College, (404) 215-2668.
3. Morehouse is a private men's college offering undergraduate liberal arts programs. Bachelor's degrees are awarded. Flight Dynamics Directorate related science and technology degrees awarded are in Chemistry, Computer Science, Mathematics, Physics, Preengineering, and Business Administration. The college has a history of research support to the USAF.

4.23 Morgan State University

1. Hillen Road & Coldspring Lane, Baltimore, MD 21239-0000, (301) 444-3333.
2. Dr. Eugene DeLoatch, Dean of the School of Engineering, (301) 444-3231.

Dr. DeLoatch firmly believes that dialogues must be established between government and university researchers pursuant to writing unsolicited proposals.

3. The university has programs leading to undergraduate liberal arts, pre-professional and professional degrees, and Master's and Doctoral degrees, emphasizing scholarship, research, and public service. Among the colleges, there is a College of Arts and Sciences, and a School of Engineering. The major engineering programs of study are Civil, Electrical, and Industrial. In 1991, a new building at the School of Engineering was completed. Grant and contract research are ongoing with various industries and agencies of the federal government.

4.24 Morris Brown College

1. 643 Martin Luther King Jr. Drive, NW, Atlanta, GA 30314-4140

2. Ms. Sheila Harris, Special Assistant to the Director, Morris Brown Research Institute, (404) 220-0127.

3. Morris Brown is a private college. Studies include bachelor level programs in Computer Science, Information Science, Mathematics, and Physics. Engineering programs include Aeronautical, Chemical, Civil, Computer, Electrical, Industrial, General, Mechanical, and Engineering Technology. Research is performed by the Institute. The Morris Brown Research Institute was established to provide professional systems and software engineering, training, and computer related products to government and private industry customers. Typical of the research conducted is maintenance and development of software systems to reduce mission planning time and optimize combat survivability in support of Tactical USAF unit level mission support systems.

4.25 Norfolk State University

1. 2401 Corprew Ave, Norfolk, VA 23504-3989

2. Mrs. Paula Shaw, Grants Administrator, Development Office, (804) 683-8264

3. The university has a special office which handles grants and contract procurement.

Each department handles its own research administration related to technical and business management of the sponsored project. Much research experience and facilities are evident in the literature received.

4.26 North Carolina Agricultural and Technical State University

1. 1601 East Market Street, Greensboro, NC 27411-0001, (919) 334-7500.
2. Mr. Marvin Watkins, Director, Research Administration, (919) 334-7995
3. The university has the ABET accreditation. It ranks third among the 16 state supported universities of North Carolina in terms of funded research. The School of Engineering is composed of six departments: Architectural Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering. The schools have Baccalaureate to Doctor of Philosophy degree programs. The faculty annually engages in research projects totaling more than \$12,000,000.00. The special unique research facilities noted are the Structures Laboratory and the Composite Materials Center, both of which have been supported by the Flight Dynamics Directorate. Overall research with the Directorate spans almost tens years.

4.27 North Carolina Central University

1. Durham, NC 27707-3129
2. Dr. John Sekora, Director of the Office of Sponsored Research, 1801 Fayetteville Street, (919) 560-6254
3. NCCU is a medium size state university with an enrollment of 4000. NCCU offers all BS programs of interest to FDD including engineering.

4.28 Paul Quinn College

1. Dallas, TX 75241-0000
2. Dr. B. Robertson, VP Development, 3837 Simpson-Stuart Road, (214) 302-3508
3. Paul Quinn College is a small school with an enrollment of 950. The school moved from Waco, TX less than 2 years ago and is undergoing a major campus renovation. Meetings were held with Dr Robertson and Dr Shaw, VP Academic Affairs.

4.29 Prairie View Agricultural and Mechanical University

1. US HWY 290 and FM 1098, Prairie View, TX 77446-9999, (409) 857-3311, FAX (409) 857-3928.

2. Dr. John Foster, Dean, College of Engineering and Architecture, (409) 857-2211

3. The College offers the Bachelor's degree in Architecture, Chemical Engineering, Civil Engineering, Electrical Engineering, and Mechanical Engineering. It also offers the Master's degree in the engineering disciplines. The Electrical Engineering Department has an excellent electronic and environmental test laboratory for parts, components, systems, and subsystems testing in accordance with MIL-SPECS and manufacturers warranties. Computer science facilities include mainframe (super), mini, workstations and PC, both interactive and stand alone. The Center for Thermo-science has significant research funding from several agencies in areas of interest to the Flight Dynamics Directorate.

4.30 Shaw University

1. Raleigh, NC 27601-2341

2. Dr. Eugene Baskerville, Dean, Science & Technology, 118 E. South St, (919) 546-8395. Co-Host: Dr. Ronald Swaim, Dir Grants & Contracts, (919) 546-8260.

3. Shaw University is a liberal arts school with an enrollment of 2150. Shaw offers all of the degrees of interest to FDD except engineering.

4.31 Sojourner-Douglas College

1. 500 North Caroline St, Baltimore MD 21205-1898

2. Dr. Andrew Jones, V.P. of Academic and Student Affairs, 500 North Caroline St, Baltimore MD, (410) 276-0306

3. Sojourner-Douglass College became an independent institution under Maryland law on February 7, 1980. The college draws students generally from the large population of adults in the Baltimore African-American community. Mathematics, and natural science are among the courses offered though no degree is offered in these fields. Dr. Jones has conducted research in the materials science area in conjunction with Hale-Thorp Extrusions, Inc., a minority institution.

4.32 South Carolina State College

1. 300 College Street, Northeast, Orangeburg, SC 29117-0001, (803) 536-7000, FAX (803) 536-8429.

2. Dr. Roy J. Isabel, Director, Office of Research and Grants Administration.
Mr. Elbert Malone, Assistant Director.

3. The college offers Baccalaureate through Doctoral degrees in the natural sciences, Engineering Technology, Mathematics, Computer Science, and Business. It currently has about \$10,000,000.00 in grants and contracts being conducted by the Division of Natural Science. The School of Engineering Technology Department of Mechanical and Civil Engineering Technology concentrates on engineering mechanics, fluid mechanics, and composite materials. Strong faculty research interest exists for computational and experimental fluid dynamics, stability and control (multi-variable control systems and digital control system architecture) and materials (composite and viscoelastic). In the Division of Natural Science Physics Department, the faculty research interests include infrared detector systems (NDE, etc) and high temperature superconductivity. The research facilities include modern equipment and instrumentation for spectroscopy, materials and environmental science, fluid dynamics, stress analysis, foundation engineering and design, CAD/CAM and VLSI design and engineering.

3 Southern University and Agricultural and Mechanical College at Baton Rouge

1. Harding Boulevard, Baton Rouge, LA 70813-0000, (504) 771-2011, FAX (504) 771-2495.

2. Dr. Rose Glee, Director, Office of Grants, Contracts, and Sponsored Research, (504) 771-2809.

3. The university has the ABET accreditation. Its College of Engineering offers the Bachelor degree in Civil, Electrical, and Mechanical Engineering, and Electronics Engineering and Mechanical Engineering Technology. The College of Sciences offers many degree programs. Among them are Computer Science, Mathematics, and Physics. The engineering research facilities include NASTRAN analysis capabilities and extensive test equipment. The university is one of four HBCUS that form a science and engineering alliance. This alliance

has a combined research faculty and staff of approximately 400 people.

4.34 Southern University and Agricultural and Mechanical College at New Orleans

1. 6400 Press Drive, New Orleans, LA 70126-0002, (504) 286-5000, FAX (504)286-5131.
2. Ms. Ivory Williams, Interim Director of Grants & Contracts, (504) 286-5098

4.35 Spelman College

1. 350 Spelman Lane S.W., Atlanta, GA 30314-4395
2. Mr. Ivan L. Page, Director of Development and Government Relations, Spelman College (404) 215-2615.
3. Spelman is a private liberal arts college for women. The college awards Bachelor's degrees in many fields including Computer and Information Science, Mathematics, natural sciences, and Physics.

4.36 Talladega College

1. 627 W. Battle Street, Talladega, AL 35160-2354
2. Dr. Eric Green, Director of Development.
3. Talladega is a small liberal arts college with an enrollment of 770. Talladega offers all B.S. degrees of interest to FDD except engineering.

4.37 Tennessee State University

1. 3500 John A. Merritt Boulevard, Nashville, TN 37209-1561, (615) 320-3420, FAX (615) 320-3114.
2. Dr. Mohan J. Malkani, Associate Dean, (615) 320-3277, School of Engineering and Technology (SE&T), and Dr Farouk Mishu Chairman, Department of Civil Engineering.
3. The university has the ABET accreditation. Offers the B.S. degree in Architectural, Civil, Electrical, and Mechanical Engineering; and Industrial Arts and Technology with options in Industrial Technology, Technical Aeronautics, and Airway Electronics Systems. A Master of Engineering degree is also offered. There are four main engineering buildings

housing over 30 laboratory and shop facilities.

The SE&T has experience in contract research with the Flight Dynamics Directorate.

4.38 Texas Southern University

1. 3201 Wheeler Avenue, Houston, TX 77004-4598, (713) 528-0611.
2. Dr. Joseph Jones, Dean, Research and Graduate Studies, (713) 527-7232; Dr. Robert L. Prater, Dean, School of Technology.
3. The School of Arts and Sciences offers the Baccalaureate through Doctoral degrees. The School of Technology offers Bachelor degrees in Electronics, Visual Communications, Construction and Manufacturing Technology, and up to the Masters degree in Transportation Studies. A two year energy studies program is offered. The availability of an on-site flight simulator makes the university unique among HBCUs.

4.39 Tuskegee University

1. Kresge Center, Tuskegee, AL 36088-0000, (205) 727-8481, FAX (205) 727-8953.
2. Dr. Vascar Harris, Dean, School of Engineering and Architecture.
3. The university has the ABET accreditation. The School of Engineering and Architecture offers the Bachelor of Science degree in Aerospace Science Engineering, and Chemical Engineering, and the Master of Science degree in Chemistry, Biology, Electrical Engineering, Mechanical Engineering, and State Physics. The school exhibits strong capabilities in materials science, fatigue of composites, fracture, computational fluid dynamics, and NDE. A special facility is the Materials Research Laboratory where research is conducted for the Office of Naval Research, the Air Force Office of Scientific Research, and the National Aeronautics and Space Administration.

4.40 University of Arkansas at Pine Bluff

1. 1100 North University Drive, Pine Bluff, AR 71601-0000
2. Dr. William Willingham, Director of The Research Center, (501) 543-8000
3. In 1972 the present name was adopted and the former Arkansas A&M became a part of the Arkansas University system. The university offers a two year program leading to

an Associate degree and a four year program leading to the Baccalaureate degree. Recently a research center was established, partially through government HBCU initiative actions. Here research in the natural science areas is conducted through sponsorship by various government agencies and industry. The research center has not yet published distribution materials on the various laboratories and research being conducted.

4.41 University of the District of Columbia

1. 4200 Connecticut Avenue, N.W., Building 48, Room 3009, Washington, DC 20008-1175, (202) 282-7300, FAX (202) 282-3671.
2. Dr. Philip L. Brach, Dean, College of Physical Science, Engineering, and Technology, (202) 292-7427, Dr. Mary Lucus, assistant to Dr. Brach
3. The university has the ABET accreditation. It is basically an undergraduate school, although it offers some graduate studies in the non-technical areas. The University has a standards laboratory which assays all construction work in Washington, D.C. Of several science, mathematics, computer science, and engineering degrees offered, the Aerospace Technology department offers B.S. degrees in Airway Science (aviation maintenance management). The laboratories include a subsonic wind tunnel where studies on an F-16 model were underway. Other noteworthy laboratories are the Robotics, Civil Engineering, Measurement Standards, and Manufacturing Technology facilities. The university has one of the few dynamic civil structure testing capabilities in universities, a supercomputer and a VAX.

Its infrastructure is aligned to handle contractual tasks and grants.

4.42 Wilberforce University

1. 1055 North Bickett Road, Wilberforce, OH 45384-9999, (513) 376-2911, FAX (513) 376-5793.
2. Dr. Ronald Glenn, Vice President for Academic Affairs, (513) 376-2911 extension 694, Dr Eric V.A. Winston, Vice President for Development, (513) 376-2911 extension 710
3. A private institution with 800 students. Approximately 8% of the students are enrolled in Computer and Information Sciences. There are well equipped laboratories for

biological, chemical, and computer studies. The university augments its faculty with computer engineers from the Aeronautical Systems Center, WPAFB. No capability current exists for addressing aerospace industrial needs.

4.43 Xavier University

1. 7325 Palmetto St., New Orleans, LA 70125-1056
2. Mr. John Pecoul, Assistant Director of Development.

5.0 Conclusions

A Structural Research Capability Database of HBCUs was developed which can be used to recall data about HBCU faculty capabilities and research interests, and special university research facilities. The records are focused toward Flight Dynamics Directorate research and technology needs and provides for promoting and increasing faculty and student participation in the Flight Dynamics Directorate research programs by availing Flight Dynamics Directorate in-house researchers with information about the cited HBCUs.

Meetings were held at forty-one universities. Current data was obtained which supersedes other published data. It is a simple matter for government researchers to look up university researchers by searching their own topics for a match to the recorded interests of individual HBCU researchers.

An actual/planned accomplishment ratio of 185% was achieved by revising travel plans to include more than one university visit per trip and receiving concept papers and unsolicited proposals offered by the universities.

APPENDIX A. DESCRIPTIVE LITERATURE LIST

1. Alabama A&M University

a. Descriptive sheets:

- (1) "Howard J. Foster Center for Irradiation of Materials
- (2) "Engineering Technology
- (3) "Mathematics"
- (4) "Physics and Applied Science"
- (5) "Civil Engineering"

b. Department of Computer and Information Sciences, briefing charts on capabilities

c. "First North Alabama Student Materials Research Conference", Apr 1991, abstracts of papers.

2. Atlanta University Center, Inc

a. "Fifteenth Annual Dual Degree Engineering Program Awards Banquet", Apr 1992, a program booklet listing honor students, awards and certificates, and program sponsors.

b. "Sixteenth Annual Dual Degree Engineering Program Awards Banquet", Apr 1993, a program booklet listing honor students, awards and certificates, and program sponsors.

3. Clark Atlanta University

a. "Clark Atlanta University", c. 1990, a comprehensive briefing on the university.

b. "Introduction of Aeromechanical Challenges - USAF/Clark-Atlanta Partnership", a briefing by Capt. Vance Johnson, WPAFB.

4. Central State University

a. "Center for Integrated Manufacturing, Protocols, Architectures, and logistics", Apr 1990, a descriptive pamphlet about a current WPAFB/WL sponsored project.

b. "Manufacturing Engineering Department Statement of Capabilities", 1990, a report.

5. Florida A&M University

- a. "Engineering - An Overview", a Florida A&M University/Florida State University brochure.

6. Grambling State University

- a. "Research Equipment and Facilities", a compilation.

7. Jackson State University

- a. "Eighth Annual Technical Assistance Conference for Historically Black Colleges and Universities", Feb 1992, an invitation for Flight Dynamics Directorate attendance and participation.

- b. "School of Science and Technology", a capability briefing.

8. Morgan State University

- a. "School of Engineering", a brochure.

9. Morris Brown Research Institute

- a. "MBRI Capabilities Overview", Jan 1992, a descriptive brochure.

10. North Carolina A&T State University

- a. "Center for Composite Materials Research", 1990, a descriptive brochure.
- b. "A Research Center of Excellence", a comprehensive brochure covering the schools of Agriculture, Arts and Sciences, Business and Economics, Education, Engineering, Nursing, Technology, and the current research projects.
- c. "Where Tomorrow Begins", a brochure covering all aspects of the university.
- d. "University Research Capability Statement", 1990-91, a report covering the capability of each department in the school of engineering, the university research experience, and the research facilities.

11. Prairie View A&M University

- a. "Prairie View A&M University", An overview and capability briefing with emphasis on engineering and research.
- b. "Mechanical Engineering Program", details on the laboratories and facilities.
- c. "Quentelle Barton, BSEE, GPA 3.6; MS", a resume.

12. Southern University and A&M College

- a. "Southern University, Baton Rouge, Louisiana", a brochure.
- b. "Southern University and A&M College", a brochure.
- c. "Science and Engineering Alliance", a brochure.
- d. Descriptive curricula sheets:
 - (1) Electrical Engineering
 - (2) Electronics Engineering Technology
 - (3) Mechanical Engineering
 - (4) Mechanical Engineering Technology
 - (5) Civil Engineering

13. Texas Southern University

- a. Descriptive curricula sheets:
 - (1) School of Technology
 - (2) Airway Science Programs
 - (3) Visual Communications Technology
 - (4) Electronic Technologies
 - (5) Manufacturing/Related Technology

14. Tennessee State University

- a. "Tennessee State University", a brochure.
- b. "Engineering and Technology Programs", a brochure.

15. Tuskegee University

a. "Materials Research Laboratory at Tuskegee University", a comprehensive brochure on mission, faculty, facility, collaborations with government and industrial researchers, and funded research.

APPENDIX B. UNSOLICITED PROPOSAL SUGGESTIONS GIVEN TO UNIVERSITIES

1. CONCEPT PAPER EXAMPLE

THIS IS AN EXAMPLE OF A CONCEPT PAPER. The text is not written to reflect a known technical need. In fact, it's contrived to fill the various sections with information which flows logically from one to the other; background, objective, etc. You may use any format and choose your own section headings, but do include subject matter appropriate to the section headings shown. One page plus a resume is sufficient. Cost and schedule estimates are not germane at this point of the unsolicited proposal process. The paper serves only to announce your intended proposal to a researcher at the Flight Dynamics Directorate who may have an interest in sponsoring the subject concept.

"HIGH TEMPERATURE MEASUREMENTS FOR STRUCTURAL THERMAL DEGRADATION STUDIES"

Proposed by P. Hdame, Ph.D., ME, HBCU University, City, ST

- BACKGROUND: Current techniques for high temperature testing of aircraft structural components impose a requirement for novel measurement and calibration schemes. Techniques must be tailored to the environmental, transient, and mechanical conditions under which measurements are contemplated; especially where extreme extraneous radiant heat flux may be sensed along with that can be indicative of the temperature values sought.

- OBJECTIVE: To determine the usefulness of exposed photographic film density measurements as a means for recording the

temperature response of materials undergoing extremely high density radiant heating.

- APPROACH:

- Literature searched and the most useful state of the art techniques cataloged.

- Theory generated. Experiment; a "brass board" model produced exhibits theoretical predictions. The theory and model behavior are demonstrated through computer simulation. Design criteria is established for production of a temperature measurement means based on the findings.

- PAY OFF:

- Increase in the state of the art in a direction applicable to satisfying USAF structural laboratory needs.

- More directly applicable educational experience for students about science and engineering practices in a USAF laboratory.

- NOTES: The HBCU University is a historically black college, and will provide laboratory space, utilities, and required facilities for this research project. A resume of Dr. P. Hdame is attached.

2. ELEMENTS OF A PROPOSAL

- **PROGRAM MANAGEMENT:**

- The general characteristics, purpose, and employment concept of the system (equipment).
- Tasks to be performed described such that costs can be related to the task.

- **BUDGET:**

- Special funding features, incremental funding, etc, if any.
- Requirements for government support in accomplishing the proposed work.
- How the work will be organized.
- Scheduling of reports.
- Professional society papers can also be considered as government technical reports.

- **TECHNICAL MANAGEMENT:**

- Performance requirements and problems requiring resolution in meeting the objective.
- Methodology for showing the government that objectives have been met.
- Performance requirements vs design requirements.

- **MARKETING**

- How proposal fits in the overall objectives of the University.
- Relation of work to other current or past work.

- **CONTRACTING:**

- Type of contract. Usually, cost without fee for a University.

This means that the amount awarded on the contract is a target, not fixed cost. The government takes all cost risks, not the University. The cum of all government